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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/532,313	11/14/2005	Jerome Assal	004501-810	9970

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EXAMINER

JEFFERSON, QUOVAUNDA

ART UNIT	PAPER NUMBER
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2823

NOTIFICATION DATE	DELIVERY MODE
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10/19/2007

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/532,313	ASSAL ET AL.	
	Examiner	Art Unit	
	Quovaunda Jefferson	2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 July 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reichert et al, US Patent 4,808,542 (as cited in previous office action).**

3. Regarding claim 1, Reichert teaches a method for forming a stepped profile from a layer sequence in which a) in a first patterning step, a first layer partial sequence **13**, which is at least partially covered by a photoresist layer **14**, is removed apart from a first residual layer partial sequence (figure 6), b) in a second patterning step, a second layer partial sequence **12** located below the first layer partial sequence is partially removed by means of etching with a second etchant (figure 7), wherein d) in the second patterning step, a region of the second layer partial sequence that is located below the first residual layer partial sequence is removed, by which a first projection of the first residual layer partial sequence being formed (figure 7), and e) in the third patterning step, the

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first projection of the first residual layer partial sequence is removed (figure 8), wherein the photoresist layer remains during the first and second patterning steps.

Reichert fails to teach c) in a third patterning step, a third layer partial sequence located below the second layer partial sequence is partially removed by means of etching with a third etchant, wherein the photoresist remains during the third patterning step.

However, the addition of duplicating layers and the etching of said layers on the invention of Reichert would be obvious to one of ordinary skill in the art, since it is well-known in the art that a multilayered material may have more than two layers and that these layers would also be etched to achieve a desirable lengths. *In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960) (Claims at issue were directed to a water-tight masonry structure wherein a water seal of flexible material fills the joints which form between adjacent pours of concrete. The claimed water seal has a "web" which lies ** in the joint, and a plurality of "ribs" ** >projecting outwardly from each side of the web into one of the adjacent concrete slabs. <The prior art disclosed a flexible water stop for preventing passage of water between masses of concrete in the shape of a plus sign (+). Although the reference did not disclose a plurality of ribs, the court held that mere duplication of parts has no patentable significance unless a new and unexpected result is produced.

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4. Regarding claim 2, Reichert teaches the second and third patterning steps are effected in aqueous solution (column 1, lines 49-51 and column 3, lines 57-67).
5. Regarding claim 3, Reichert teaches the first patterning step is carried out by means of etching with a first etchant (column 3, lines 57-67).
6. Regarding claim 4, Reichert a substantially identical chemical composition is chosen for the first etchant and for the third etchant (column 3, line 67).
7. **Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Reichert as applied to claim 1 above, and further in view of Ohori et al, US Patent 6,156,662 (as cited in previous office action).**
8. Regarding claim 5, Reichert fails to teach in the first patterning step, the first layer partial sequence is removed to an extent such that a second projection of the protective layer arises, which second projection has a length t_1 greater than a thickness d_1 of the first layer partial sequence.

Ohori teaches in the first patterning step, the first layer partial sequence **46a** or **46b** is removed to an extent such that a second projection of the protective layer **48** arises, which second projection has a length t_1 greater than a thickness d_1 of the first layer partial sequence (Ohori, column 10, lines 24-25 and figure 11) because barrier

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types patterns undergo certain recessions when as a result of using a wet etching process.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Ohori with that of Reichert because barrier types patterns undergo certain recessions when as a result of using a wet etching process.

9. Claims 6, 7, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reichert as applied to claim 1 above, and further in view of Wood et al, US Patent 3,663,184 (as cited in previous office action).

10. Regarding claim 6, Reichert fails to teach the first layer partial sequence substantially comprises Ag, the second layer partial sequence substantially comprises Ni, and the third layer partial sequence substantially comprises Ti.

Wood teaches the first layer partial sequence **20** substantially comprises Ag, the second layer partial sequence **16** substantially comprises Ni, and the third layer partial sequence **15** substantially comprises Ti (column 3, line 42, column 4, lines 7, and column 4, line 41) by teaching the conventional use of three metals known in the art in the formation of a solder bump pad used in semiconductor package manufacturing.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Wood with that of Reichert because Ag, Ni, and Ti are three of the many types of metal conventionally used in the semiconductor art, with one particular use being in the formation of a solder bump pad used in semiconductor package manufacturing.

11. Regarding claim 7, Reichert fails to teach an aqueous solution of nitric acid is used as a second etchant.

Wood teaches an aqueous solution of nitric acid is used as the second etchant (column 4, lines 7-9) as a conventionally used wet etchant that is well known for selective etching of layers in a semiconductor device.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Wood with that of Reichert because nitric acid is a conventionally used wet etchant that is well-known for selective etching of layers in a semiconductor device.

12. Regarding claim 10, Reichert and Wood fail to teach a nitric acid in a dilution ratio of 1:z where $2.0 < z < 8.0$.

However, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose these particular dimensions because applicant has not disclosed that the dimensions are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, and it appears prima facie that the process would possess utility using another dimension. Indeed, it has been held that mere dimensional limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See, for example, *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

13. Claims 8 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reichert as applied to claim 3 above, and further in view of Wang et al, US Patent 5,160,492 (as cited in previous office action).

14. Regarding claim 8, Reichert fails to teach a mixture of hydrogen peroxide, ammonium hydroxide and water.

Wang teaches a mixture of hydrogen peroxide, ammonium hydroxide and water is used as the first and third etchants preferably in a volume ratio of approximately 1:x:y

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(column 5, line 3) because the combination of hydrogen peroxide, ammonium hydroxide and water yield a strong etch.

It would be obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Wang with that of Reichert because the combination of hydrogen peroxide, ammonium hydroxide and water yield a strong etch.

15. Regarding claim 11, Reichert and Wang fail to teach a mixture of hydrogen peroxide, ammonium hydroxide and water, preferably in a volume ratio of approximately 1:x: y, where $0.5 < x < 2.0$ and $4.0 < y < 10.0$.

However, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose these particular dimensions because applicant has not disclosed that the dimensions are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, and it appears prima facie that the process would possess utility using another dimension. Indeed, it has been held that mere dimensional limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See, for example, *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); *Gardner v. TEC Systems, Inc.*,

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725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

Response to Arguments

Applicant's arguments with respect to claims 1-11 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quovaunda Jefferson whose telephone number is 571-272-5051. The examiner can normally be reached on Monday through Friday, 7AM to 3:30PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

QVJ
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PRIMARY PATENT EXAMINER